



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,515	11/26/2003	Adam L. Cohen	P-US024-A-MF	1836
32107 7590 02/08/2007 MICROFABRICA INC. ATT: DENNIS R. SMALLEY 7911 HASKELL AVENUE VAN NUYS, CA 91406			EXAMINER CULBERT, ROBERTS P	
			ART UNIT	PAPER NUMBER
			1763	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/08/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/724,515

Applicant(s)

COHEN ET AL.

Examiner

Roberts Culbert

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration:
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Terminal Disclaimer

The terminal disclaimer filed on 11/15/06 disclaiming the terminal portion of any patent granted on this application, which would extend beyond the expiration date of U.S. Patent Application No. 10/997,709 filed on n Nov 24, 2004 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 9 and 10 rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,301,415 to Prinz et al.

Prinz et al. teach a process for forming a multilayer three-dimensional structure, comprising: (a) forming and adhering a layer of material (deposition material) to a substrate, wherein the substrate may include one or more previously formed layers; (b) repeating the forming and adhering operation of (a) a plurality of times to build up a three-dimensional structure from a plurality of adhered layers; wherein the formation of each of at least a plurality of layers, comprises:

(1) obtaining a selective pattern of deposition of a first material having at least one void, comprising at least one of:

(a) selectively depositing a first material onto the substrate such that at least one void remains, wherein the depositing comprises:

(i) bringing a mating surface of a contact mask and a mating surface of the substrate together, wherein initial contact between the mating surface of the substrate and the mating surface of the contact mask occurs in a controlled manner at only selected locations (Figures 2 and 7) and wherein continued

Art Unit: 1763

relative movement between the mask and the substrate bring substantially all relevant mating surfaces of the mask into contact with the substrate.

(ii) depositing the first material onto the substrate with the contact mask in place, and

(iii) separating the contact mask and the substrate to expose the at least one void.

Regarding Claims 2-4, Prinz et al. teach separation between mated and unmated portions defines a straight line or a closed loop that is substantially a circle as broadly claimed by applicant. Note that the recited limitation reads on substantially any boundary formed between mated and unmated portions.

Regarding Claim 5, Prinz et al. teach that at initial contact some portions of the masking material (10) are separated by from corresponding mating locations by an alignment tolerance that is greater than that dictated by an alignment tolerance. (See Figures 2 and 7)

Regarding Claim 6, Prinz et al. teach that the mask prior to mating is forced to have a curvature that is greater than a tolerance in setting curvature. (Figures 2 and 7)

Regarding Claim 9, Prinz et al. teach that the formation of the plurality of layers additionally comprises at least one planarization operation. (Col. 8, Lines 10-15)

Regarding Claim 10, Prinz et al. teach that the formation of the plurality of adhered layers comprises deposition of a second material (complementary material)

Claims 1-11, 14, 15, and 17-23 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,027,630 to Cohen.

Regarding Claims 1, 14, 17 and 21-23, Cohen teaches the method of the invention substantially as claimed including a process for forming a multilayer three-dimensional structure, comprising:

(a) forming and adhering a layer of material to a substrate (electroplating a metal), wherein the substrate may include one or more previously formed layers; (C1, L44-63)

(b) repeating the forming and adhering operation of (a) a plurality of times to build up a three-dimensional structure from a plurality of adhered layers; wherein the formation of each of at least a plurality of layers, comprises:

Art Unit: 1763

(1) obtaining a selective pattern of deposition of a first material having at least one void, comprising at least one of:

(a) selectively depositing a first material onto the substrate such that at least one void remains, wherein the depositing comprises:

(i) bringing a mating surface of a contact mask and a mating surface of the substrate together;

(C1, L45-46)

(ii) depositing the first material onto the substrate with the contact mask in place; (C1, L47-49)

(iii) separating the contact mask and the substrate to expose the at least one void. (C1, L50-51)

Regarding Claim 1, Cohen does not expressly recite that initial contact between the mating surface of the substrate and the mating surface of the contact mask occurs in a controlled manner at only selected locations, and wherein continued relative movement between the mask and the substrate bring substantially all relevant mating surfaces of the mask into contact with the substrate. However, the limitation reads on pressing an elastically deformable mask towards a the surface of a substrate to be plated to eliminate the presence of gaps between the mask and the substrate as recited by Cohen (C5, L58-41)

Regarding Claim 11, Cohen teaches that a shape of the mating surface of the substrate or of the first material remains substantially constant during a course of mating and a shape of the mating surface of the mask changes during the course of mating such that upon completion of mating, the shapes of the mating surface of the mask, and of the mating surface of the substrate or the mating surface of the first material are substantially the same in at least those areas intended for mating. (C5, L25-41)

Regarding Claims 14, 15 and 21, Cohen does not expressly recite that at initial contact the mating surface of the mask has a first curvature and a mating surface of the substrate has a second curvature, wherein the first curvature has a nominal radius that is less than that of the second curvature, and wherein after initial contact a separation of the mask and substrate is further reduced so that additional mating occurs and such that the first curvature changes to be more like the second curvature. However, the limitation reads on pressing an elastically deformable mask towards a the surface of a substrate to be plated to eliminate the presence of gaps between the mask and the substrate as recited by Cohen (C5,

Art Unit: 1763

L58-41) since the elastic materials conform to the variations (concavity and convexity) in a substrate as the substrate and mask are pressed together.

Regarding Claims 17-20, 22 and 23, Cohen does not expressly recite that at initial contact the mating surface of the mask is more convex relative to the substrate, however the limitation reads on a conformable mask as recited in Cohen, since such a mask responds to the variations in curvature (concavity and convexity) of a substrate by deforming elastically as the surface of the substrate and mask are pressed uniformly together.

Regarding Claims 2-4, Cohen teaches that a separation between mated and unmated portions defines a straight line or a closed loop that is substantially a circle as broadly claimed by applicant. Note that the recited limitation reads on substantially any boundary formed between mated and unmated portions.

Regarding Claims 5, 6 and 8, Cohen teaches that the elastically deformable mask is pressed against the substrate "using a well-controlled uniform pressure". And that the deforming process eliminates "the presence of gaps" Thus, at initial contact, some portions of the mating surface of the mask and corresponding mating locations on the substrate are separated by a distance greater than that dictated by an alignment tolerance between the mask and the substrate.

Regarding Claim 7, Cohen teaches using excess gas or liquid pressure on one side of the mask (C7, L6-16).

Regarding Claim 9, Cohen teaches that the formation of the plurality of layers additionally comprises at least one planarization operation. (Col. 13, Line 58 – Col. 14, Line 33)

Regarding Claim 10, Cohen teaches that the formation of the plurality of adhered layers comprises deposition of a second material. (Col. 1, Lines 58-61)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1763

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 12, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,027,630 to Cohen.

Regarding Claims 12, 13 and 16, as applied above, Cohen teaches the method of the invention substantially as claimed, but does not expressly teach that the substrate conforms to the mask. However, Cohen teaches that the mask (electroplating article) may be rigid or may be elastically deformable or flexible (C7, L48-51) Cohen further teaches substrates having varying flexibility from silicon wafers to integrated circuit materials "devices from thin layers of materials" (C2, L62 - C3, L2), and indicates that the curvature of the substrate may vary. (C5, L38-41) Cohen further teaches that upon completion of mating, the shapes of the mating surface of the mask, and of the mating surface of the substrate are substantially the same in at least those areas intended for mating. (C5, L25-41) Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to perform the mating such that a mating surface of the mask changes or remains substantially constant during a course of mating depending on the substrate material and thickness, and a shape of the mating surface of the substrate changes during the course of mating such that upon completion of mating, the shapes of the mating surface of the mask, and of the mating surface of the substrate are substantially the same in at least those areas intended for

Art Unit: 1763

making in order to provide alignment and registration between various materials in the well known manner.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



R. Culbert
Examiner
Art Unit 1763